CLAIMS

What is claimed is:

1. A method comprising:

determining a power level of noise in a signal;

detecting whether impulse noise is in the signal;

determining a gain factor associated with the impulse noise; and

applying the gain factor to the power level of noise in the signal to calculate an equivalent noise power.

2. The method of claim 1, further comprising:

determining a signal-to-noise ratio based on a signal power of the signal and the equivalent noise power.

3. The method of claim 2, wherein the signal is a multicarrier signal including a plurality of sub-carriers.

4. The method of claim 3, wherein the impulse noise in the signal is detected based on data from the plurality of sub-carriers.

5. The method of claim 3, wherein detecting whether the impulse noise is in the signal comprises, for each sub-carrier:

determining a maximum error amplitude (m); and

determining a spike rate.

6. The method of claim 5, wherein detecting whether impulse noise is in the signal further comprises:

determining a number of sub-carriers, (c), where the spike rate is greater than a rate threshold;

if c is greater than a carrier threshold, for each sub-carrier, calculating a peak-to-average ratio, PAR, as $PAR=\frac{m}{\sigma}$, where σ^2 is the noise power of the sub-carrier; and

for each sub-carrier, if the PAR is greater than a PAR threshold, calculating the gain factor, G_I as:

$$G_I = 1 + \left(\frac{2}{\alpha}\right) PAR ,$$

where α is a constant factor based on an error rate and a sub-carrier coding scheme.

7. The method of claim 6, wherein the equivalent noise power σ_e for a sub-carrier is calculated as $\sigma_e = \sigma \ G_I$.

8. The method of claim 5, wherein determining a spike rate for a sub-carrier comprises determining a number of error samples above a predetermined spike threshold.

9. The method of claim 8, further comprising lowering the spike threshold if impulse noise is detected in the signal.

10. The method of claim 6, further comprising lowering the rate threshold if impulse noise is detected in the signal.

11. The method of claim 2, further comprising determining bit-loading based on the signal-to-noise ratio.

12. The method of claim 3, further comprising if impulse noise is detected in the signal:

determining the gain factor and the equivalent noise power for a first sub-carrier; and

determining the gain factor and the equivalent noise power for a second sub-carrier.

13. A method comprising:

determining a power level of Gaussian noise in a signal;

detecting whether non-Gaussian noise is in the signal;

determining a gain factor associated with the non-Gaussian noise; and

applying the gain factor to the power level of the Gaussian noise in the signal to calculate an equivalent noise power.

14. The method of claim 13, further comprising:

determining a signal power of the signal; and

determining a signal-to-noise ratio based on the signal power of the signal and the equivalent noise power.

15. The method of claim 14, wherein the signal is a multicarrier signal including a plurality of sub-carriers.

16. A machine-readable medium storing executable instructions to a cause a device to perform a method comprising:

determining a power level of noise in a signal;

detecting whether impulse noise is in the signal;

determining a gain factor associated with the impulse noise; and

applying the gain factor to the power level of noise in the signal to calculate an equivalent noise power.

17. The machine-readable medium of claim 16, wherein the method further comprises:

determining a signal-to-noise ratio based on a signal power of the signal and the equivalent noise power.

18. The machine-readable medium of claim 17, wherein the signal is a multicarrier signal including a plurality of sub-carriers.

19. The machine-readable medium of claim 18, wherein the impulse noise in the signal is detected based on data from the plurality of sub-carriers.

20. The machine-readable medium of claim 18, wherein detecting whether the impulse noise is in the signal comprises, for each sub-carrier:

determining a maximum error amplitude (m); and

determining a spike rate.

21. The machine-readable medium of claim 20, wherein detecting whether impulse noise is in the signal further comprises:

determining a number of sub-carriers, (c), where the spike rate is greater than a rate threshold;

if c is greater than a carrier threshold, for each sub-carrier, calculating a peak-to-average ratio, PAR, as $PAR = \frac{m}{\sigma}$, where σ^2 is the noise power of the sub-carrier; and

for each sub-carrier, if the PAR is greater than a PAR threshold, calculating the gain factor, G_I as:

$$G_I = 1 + \left(\frac{2}{\alpha}\right) PAR \,,$$

where α is a constant factor based on an error rate and a sub-carrier coding scheme.

22. The machine-readable medium of claim 21, wherein the equivalent noise power σ_e for a sub-carrier is calculated as $\sigma_e = \sigma \; G_I$.

23. The machine-readable medium of claim 20, wherein determining a spike rate for a sub-carrier comprises determining a number of error samples above a predetermined spike threshold.

24. The machine-readable medium of claim 23, wherein the method further comprises lowering the spike threshold if impulse noise is detected in the signal.

25. The machine-readable medium of claim 21, wherein the method further comprises lowering the rate threshold if impulse noise is detected in the signal.

26. The machine-readable medium of claim 17, wherein the method further comprises determining bit-loading based on the signal-to-noise ratio.

27. The machine-readable medium of claim 18, wherein the method further comprises, if impulse noise is detected in the signal:

determining the gain factor and the equivalent noise power for a first sub-carrier; and

determining the gain factor and the equivalent noise power for a second sub-carrier.

28. A machine-readable medium storing executable instructions to a cause a device to perform a method comprising:

determining a power level of Gaussian noise in a signal;

detecting whether non-Gaussian noise is in the signal;

determining a gain factor associated with the non-Gaussian noise; and

applying the gain factor to the power level of the Gaussian noise in the signal to calculate an equivalent noise power.

29. The machine-readable medium of claim 28, wherein the method further comprises:

determining a signal power of the signal; and

determining a signal-to-noise ratio based on the signal power of the signal and the equivalent noise power.

30. The machine-readable medium of claim 29, wherein the signal is a multicarrier signal including a plurality of sub-carriers.

31. An apparatus comprising:

means for determining a power level of noise in a signal;

means for detecting whether impulse noise is in the signal;

means for determining a gain factor associated with the impulse noise; and

means for applying the gain factor to the power level of noise in the signal to calculate an equivalent noise power.

32. The apparatus of claim 31, further comprising:

means for determining a signal-to-noise ratio based on a signal power of the signal and the equivalent noise power.

33. The apparatus of claim 32, wherein the signal is a multicarrier signal including a plurality of sub-carriers.

34. The apparatus of claim 33, wherein the impulse noise in the signal is detected based on data from the plurality of sub-carriers.

35. The apparatus of claim 33, wherein the means for detecting whether the impulse noise is in the signal comprises, for each sub-carrier:

means for determining a maximum error amplitude (m); and

means for determining a spike rate.

36. The apparatus of claim 35, wherein the means for detecting whether impulse noise is in the signal further comprises:

means for determining a number of sub-carriers, (c), where the spike rate is greater than a rate threshold;

if c is greater than a carrier threshold, for each sub-carrier, means for calculating a peak-to-average ratio, *PAR*, as $PAR=\frac{m}{\sigma}$, where σ^2 is the noise power of the sub-carrier; and

for each sub-carrier, if the *PAR* is greater than a PAR threshold, means for calculating the gain factor, G_l as:

$$G_I = 1 + \left(\frac{2}{\alpha}\right) PAR ,$$

where α is a constant factor based on an error rate and a sub-carrier coding scheme.

37. The apparatus of claim 36, wherein the equivalent noise power σ_e for a sub-carrier is calculated as $\sigma_e = \sigma \; G_I$.

38. The apparatus of claim 35, wherein the means for determining a spike rate for a sub-carrier comprises means for determining a number of error samples above a predetermined spike threshold.

39. The apparatus of claim 38, further comprising means for lowering the spike threshold if impulse noise is detected in the signal.

40. The apparatus of claim 36, further comprising means for lowering the rate threshold if impulse noise is detected in the signal.

41. The apparatus of claim 32, further comprising means for determining bit-loading based on the signal-to-noise ratio.

42. The apparatus of claim 33, further comprising if impulse noise is detected in the signal:

means for determining the gain factor and the equivalent noise power for a first sub-carrier; and

means for determining the gain factor and the equivalent noise power for a second sub-carrier.

43. An apparatus comprising:

means for determining a power level of Gaussian noise in a signal;

means for detecting whether non-Gaussian noise is in the signal;

means for determining a gain factor associated with the non-Gaussian noise; and

means for applying the gain factor to the power level of the Gaussian noise in the signal to calculate an equivalent noise power.

44. The apparatus of claim 43, further comprising:

means for determining a signal power of the signal; and

means for determining a signal-to-noise ratio based on the signal power of the signal and the equivalent noise power.

45. The apparatus of claim 44, wherein the signal is a multicarrier signal including a plurality of sub-carriers.